Impact of Respondent Errors on Percentages of Self-Perceived Declining Health Status during Deployment

7th of 7 Presentations for DEEP Update

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Force Health Protection Conference
Louisville, KY August 2005

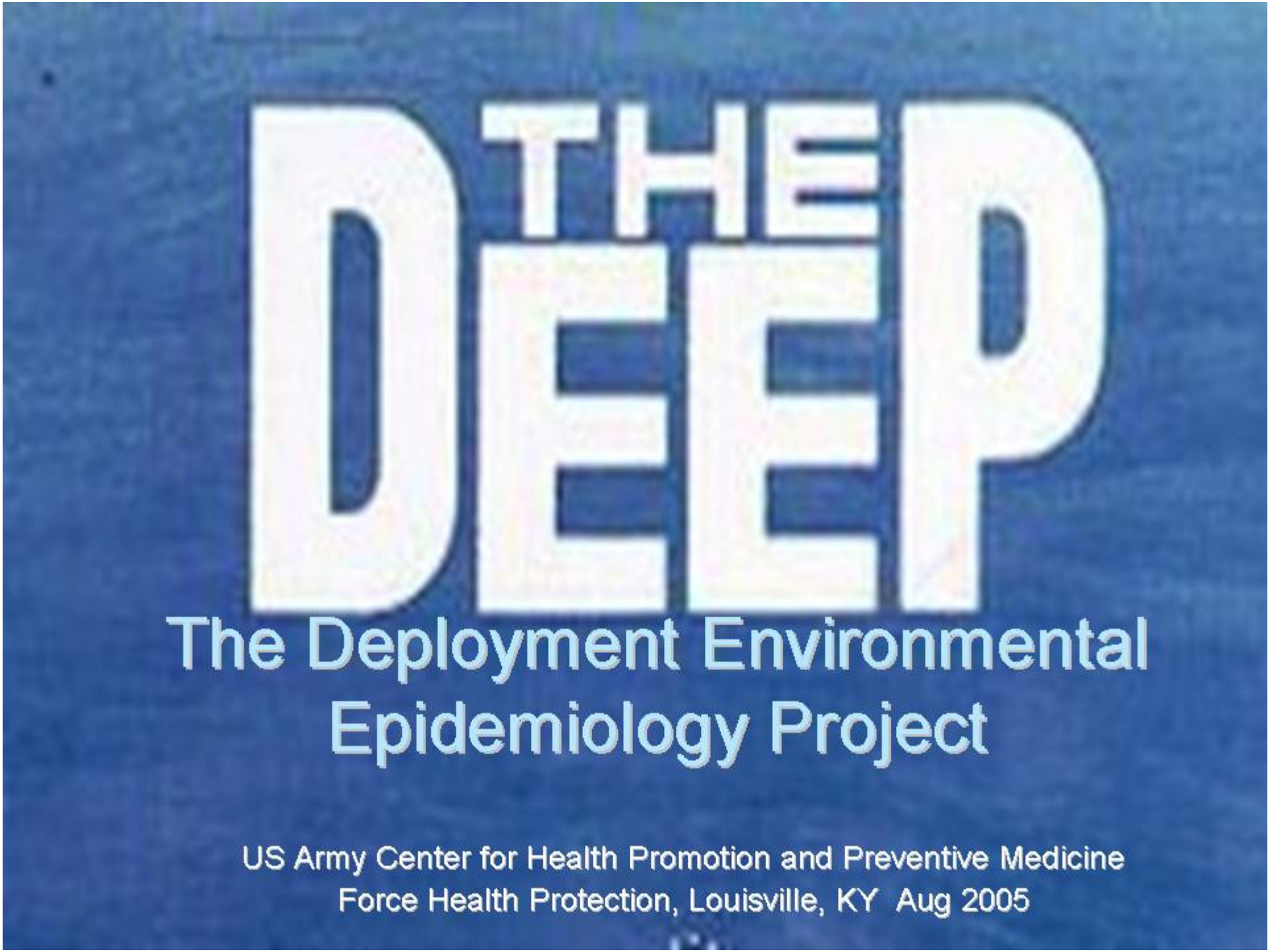
THE DEEP
The Deployment Environmental Epidemiology Project
US Army Center for Health Promotion and Preventive Medicine
Force Health Protection, Louisville, KY Aug 2005

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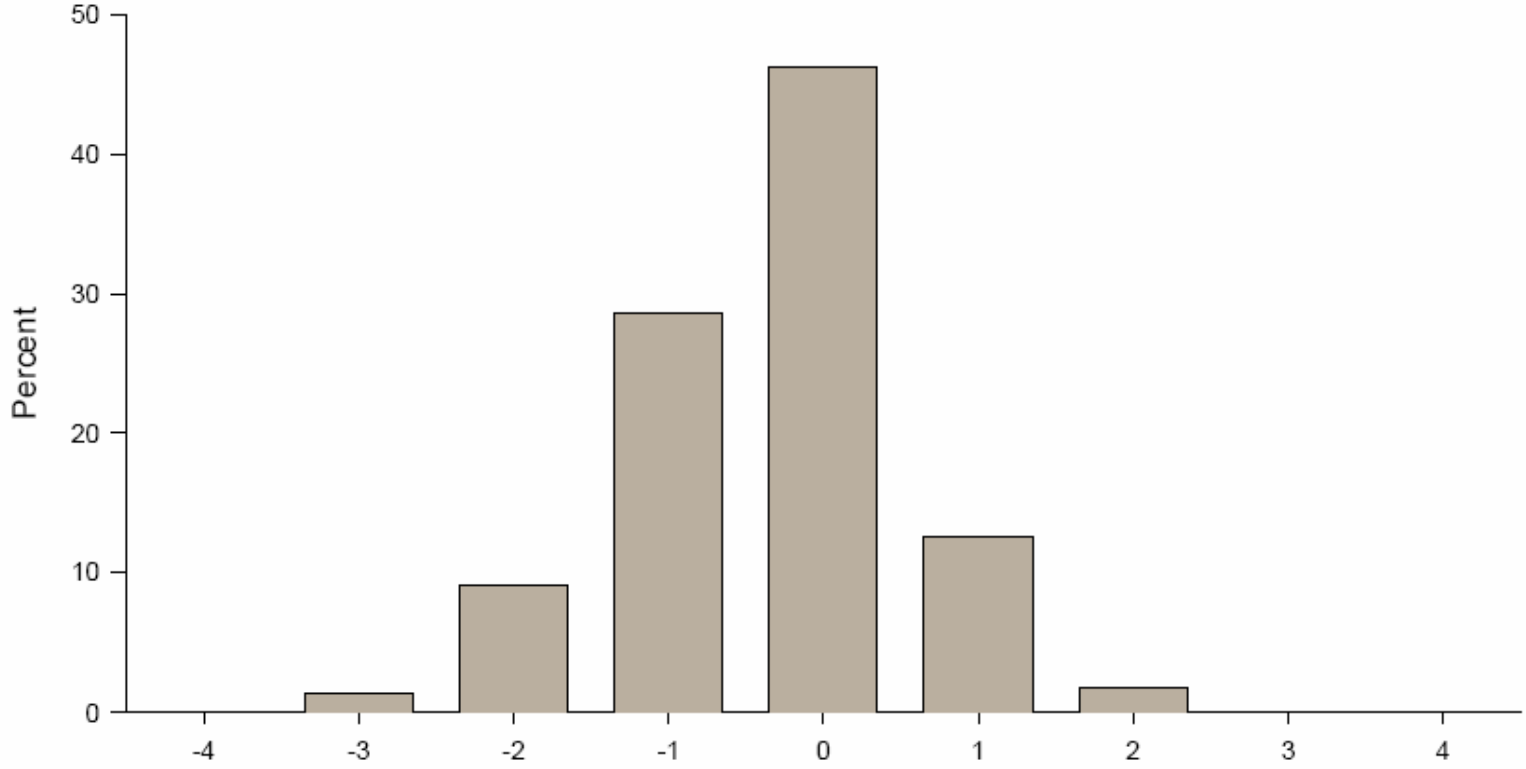
Figure 3. Distribution of self-assessed health status changes from pre- to post-deployment, US Armed Forces, 1 January 2003-31 December 2004.



Change in self-assessment of overall health status, pre- to post-deployment, calculated as: post deployment response - pre-deployment response, using the following scale for health status: 1= "poor"; 2="fair"; 3="good"; 4="very good"; and 5="excellent."

Update: Pre- and Post-deployment Health Assessments, US Armed Forces, September 2002-December 2004

The June 2003 issue of the *MSMR* summarized the background, rationale, policies, and guidelines related to pre-deployment and post-deployment health assessments of servicemembers.[1-10] Briefly, prior to deploying, the health of each servicemember is assessed to ensure his/her medical fitness and readiness for deployment. At the time of redeployment, the health of each servicemember is again assessed to identify medical conditions and/or exposures of concern to ensure timely and comprehensive evaluation and treatment.

Completed pre- and post-deployment health assessment forms are routinely sent (in hard copy or electronic form) to the Army Medical Surveillance Activity (AMSA) where they are archived in the Defense Medical Surveillance System (DMSS).[11] In the DMSS, data recorded on pre- and post-deployment health assessments are integrated with data that document demographic characteristics, military experiences, and medical encounters of all servicemembers (e.g., hospitalizations, ambulatory visits, immunizations).[11] The continuously expanding DMSS database can be used to monitor the health of servicemembers who participated in major oversees deployments.[11-13]

The overall success of deployment force health protection efforts depends at least in part on the completeness and quality of pre- and post-deployment health assessments. This report summarizes characteristics of servicemembers who completed pre-deployment (since 1 September 2002) and post-deployment (since 1 January 2003) forms; responses to selected questions on pre- and post-deployment forms; and changes in responses of individuals from pre-deployment to post-deployment.

Methods. For this update, the DMSS was searched to identify all pre-deployment health assessments (DD Form 2795) that were completed after 1 September 2002 (in order to include those of servicemembers who deployed in October 2002) and all post-deployment health assessments (DD Form 2796) that were completed after 1 January 2003.

Results. From 1 September 2002 to 31 December 2004, 884,138 pre-deployment health assessments were completed at field sites, shipped to AMSA, and integrated in the DMSS database (table 1). From 1 January 2003 to 31 December 2004, 722,975 post-deployment health assessments were completed at field sites, shipped to AMSA, and entered into the DMSS database (table 1).

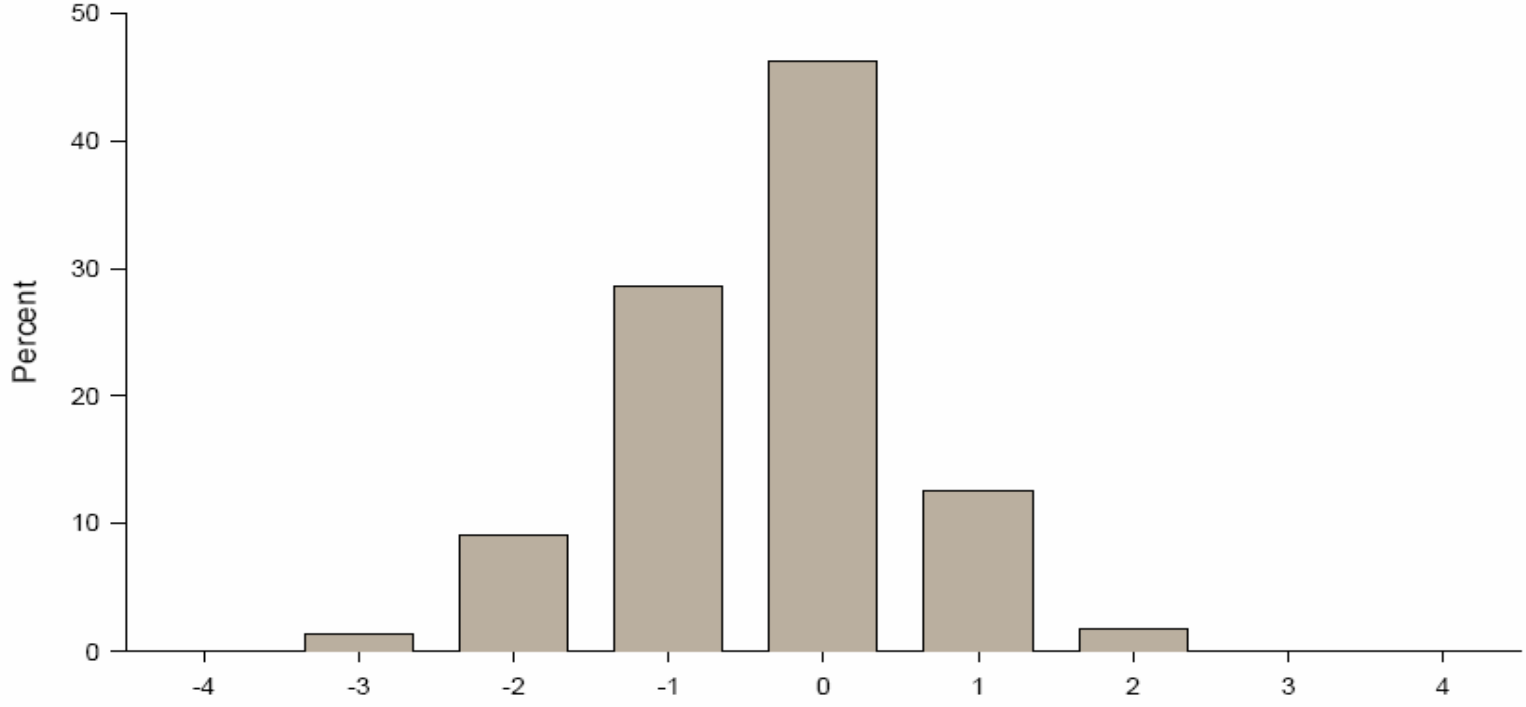
In general, the distributions of self-assessments of "overall health" were similar among pre- and post-deployment form respondents (figure 1). For example, both prior to and after deployment, the most frequent descriptor of "overall health" was "very good." Of note, however, relatively more pre- (32%) than post- (22%) deployment respondents assessed their overall health as "excellent"; while more post- (41%) than pre- (26%) deployment respondents assessed their overall health as "good," "fair," or "poor" (figure 1).

Among servicemembers (n=376,331) who completed both a pre- and a post-deployment health assessment, nearly half (46%) chose the same descriptor of their overall health before and after deploying (figures 2, 3). Of those (n=202,414) who changed their assessments from pre- to post-deployment, approximately three-fourths (77%) changed by a single category (on a five category scale) (figure 2,3); and of those who changed by more than one category, more than 5-times as many indicated a decrement in overall health (n=40,046; 11% of all respondents) than an improvement (n=7,229; 2% of all respondents) (figure 3).

On post-deployment forms, approximately 21% of active and 37% of Reserve component respondents reported "medical/dental problems." Among active component respondents, "medical/dental problems" were more frequently reported by soldiers and Marines than by members of the other Services; while among Reservists, members of the Army, Navy, and Marines were at least twice as likely to report "medical/dental problems" as were Air Force members (table 2).

Interpretation Difficulties Associated with the Distribution of Self-Assessed Health Status Changes from Pre- to Post-Deployment

Figure 3. Distribution of self-assessed health status changes from pre- to post-deployment, US Armed Forces, 1 January 2003-31 December 2004.



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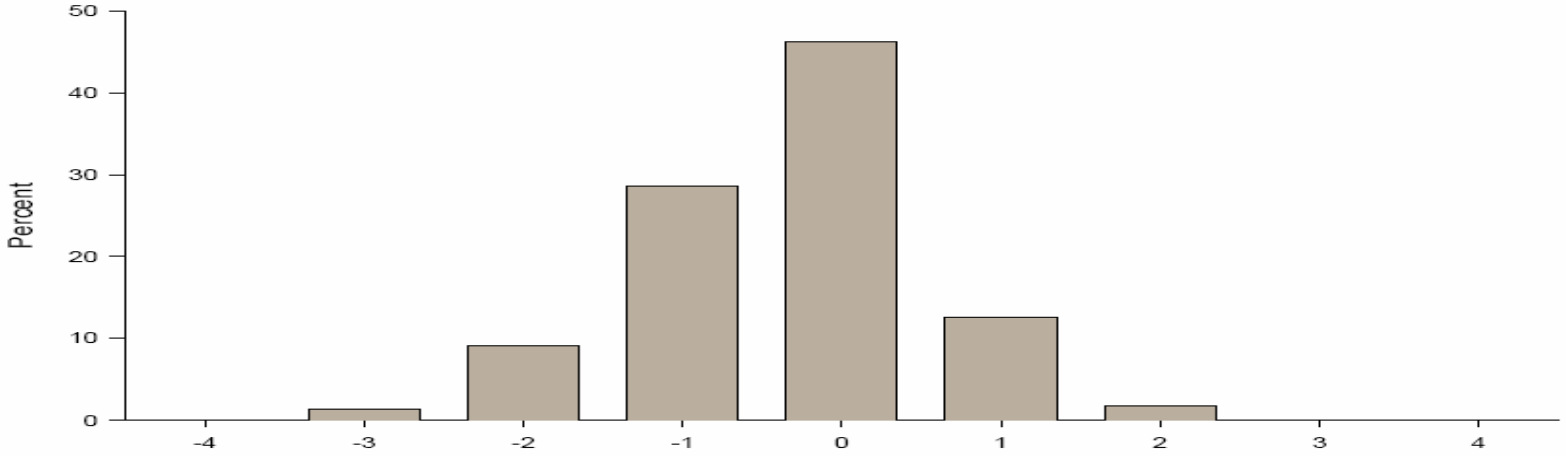

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What do we learn from the distribution?

- More servicemembers with smaller step changes
  P(0) = 45%, P(-1) = 30%, P(-2) = 10%, and P(-3) = 2%
- More servicemembers with negative step changes
  P(-1) = 30% vs. P(1) = 12%, P(-2) = 10% vs. P(2) = 2%

Probability Distribution of Self-Assessed Health Status Changes from Pre- to Post-Deployment

$$P(S) = \sum_{H}^{\{E,V,G,F,P\}} P(H)P(S/H)$$

Where,

S ~ step change of health status

S= -4, -3, -2, -1, 0, 1, 2, 3, 4

H ~ health status at pre-deployment

H =Excellent, Very good, Good, Fair, Poor

P(S) ~ probability of health status change at step S

P(H) ~ Probability of H health status at pre-deployment

P(S/H) ~ Conditional probability of S given H

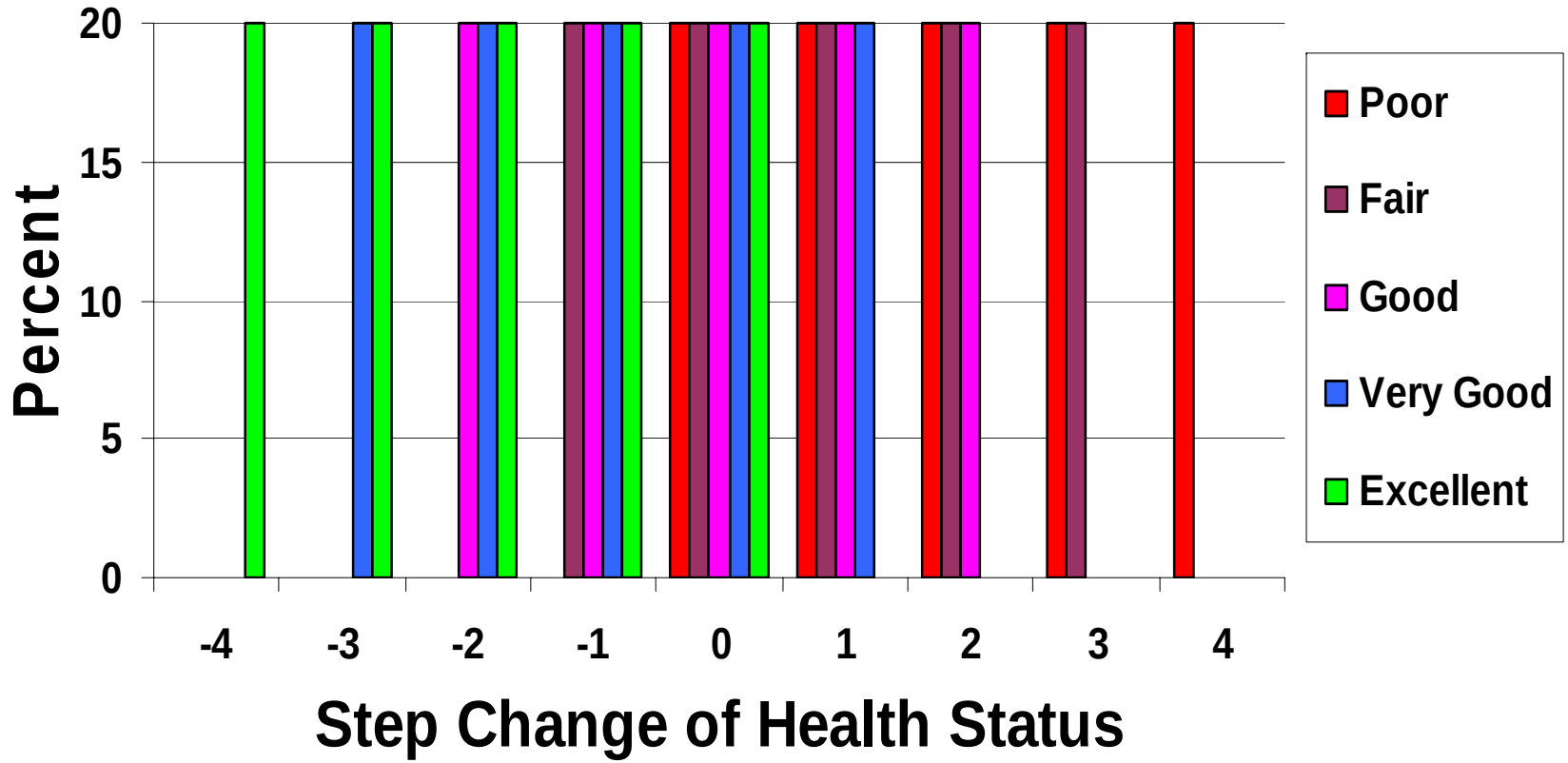
Examples

$P(-4) = P(E)P(-4/E)$

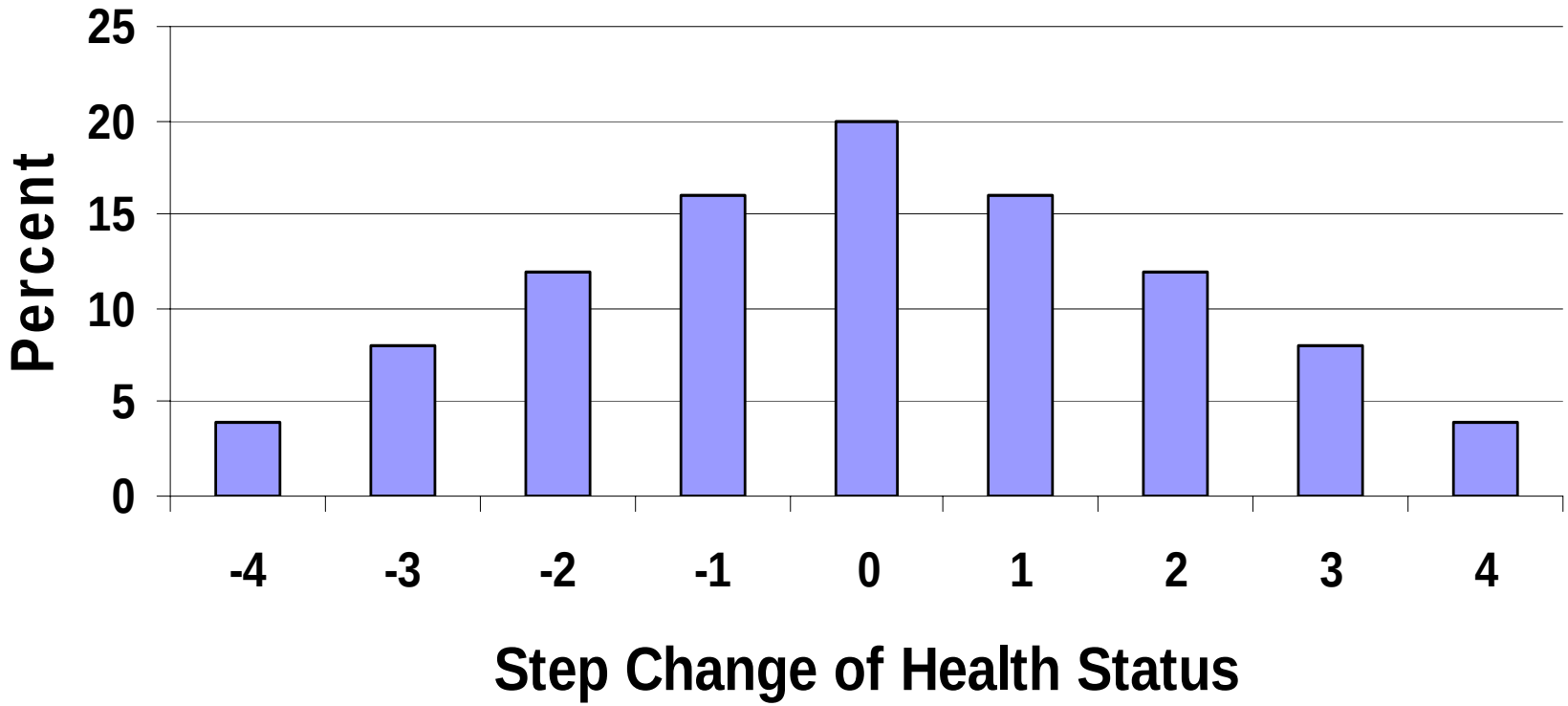
$P(-3) = P(E)P(-3/E) + P(V)P(-3/V)$

$P(-2) = P(E)P(-2/E) + P(V)P(-2/V) + P(G)P(-2/G)$

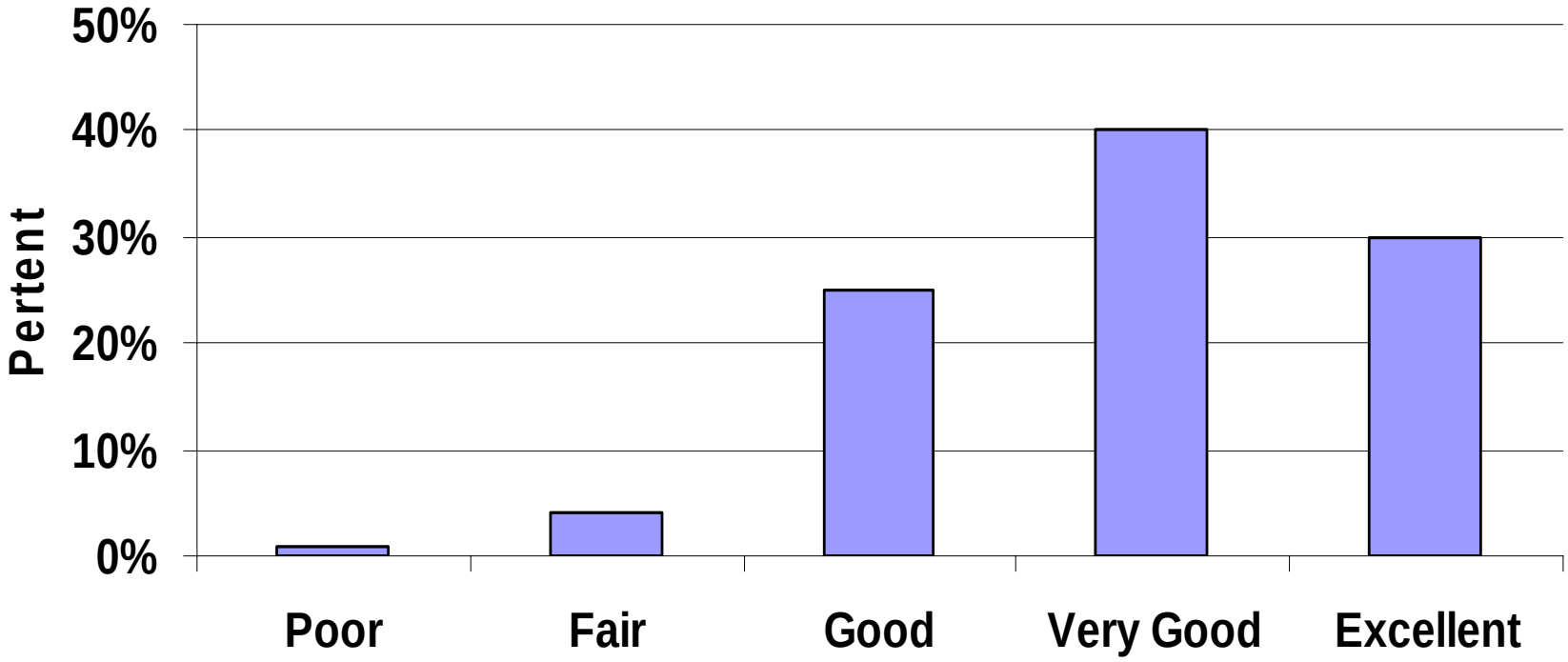
Uniform Conditional Probability of Health Step Changes Given Pre-Deployment Health Status



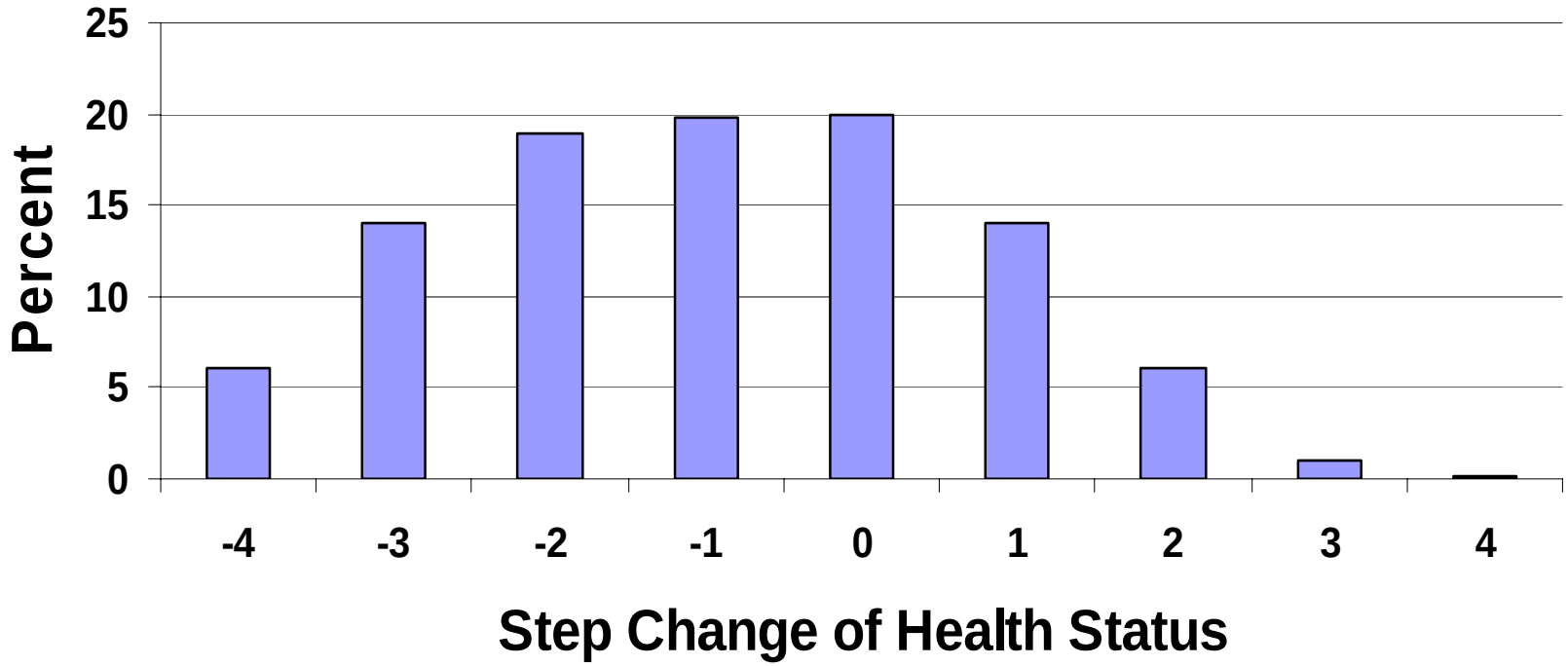
Uniform Conditional Probability Distribution of Health Step Changes



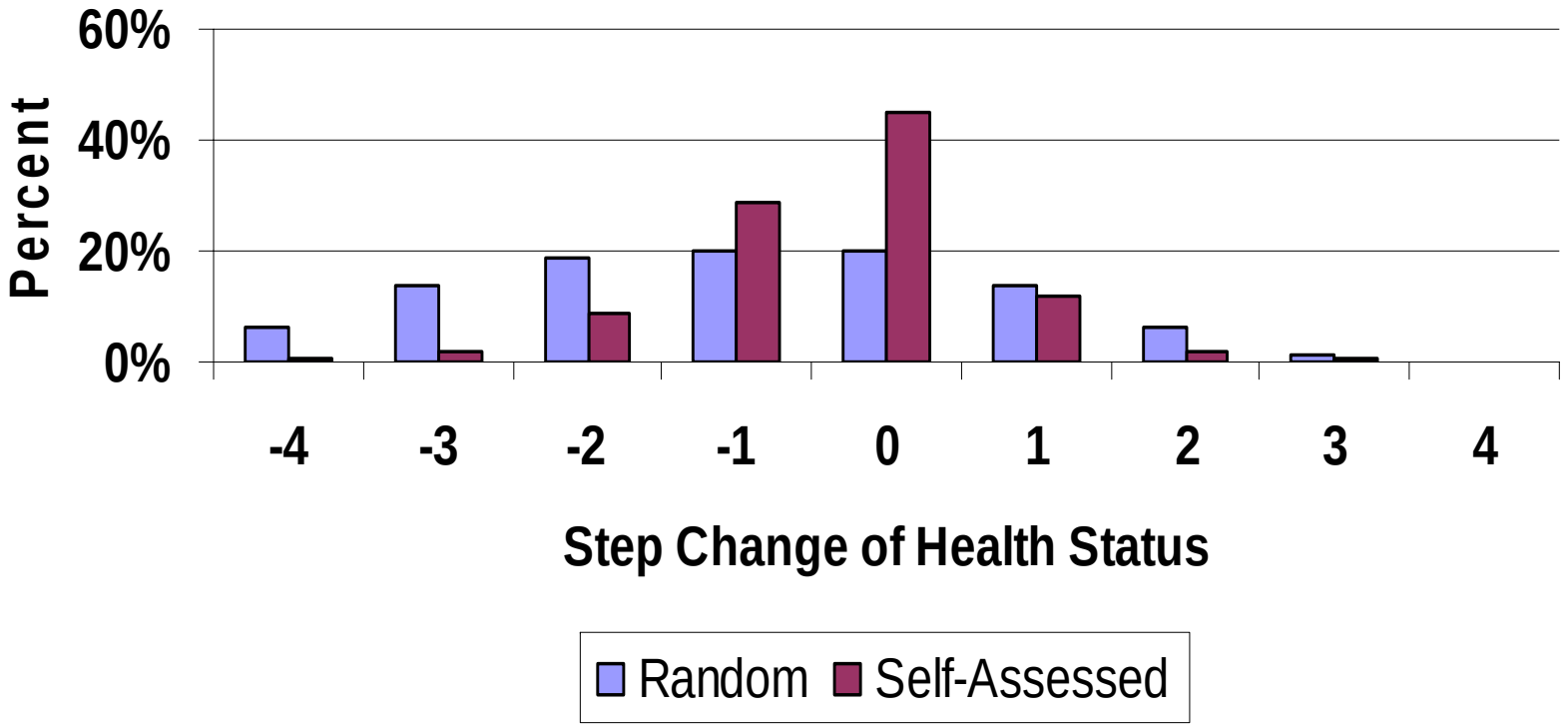
Distribution of Health Status at Pre-Deployment



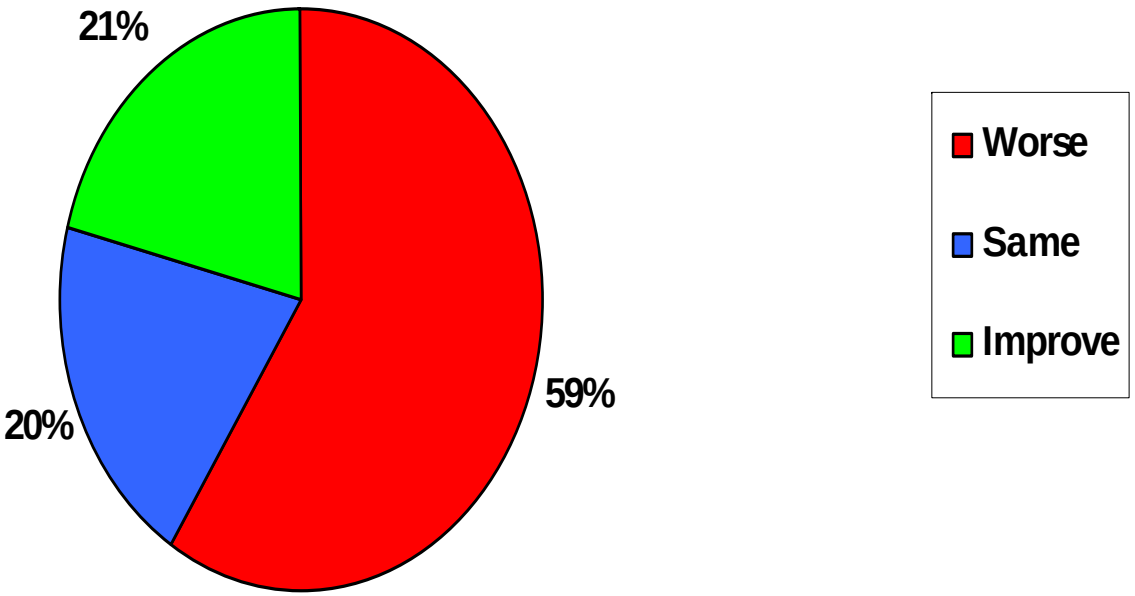
Distribution of Random Self-Assessed Health Status Changes from Pre- to Post-Deployment



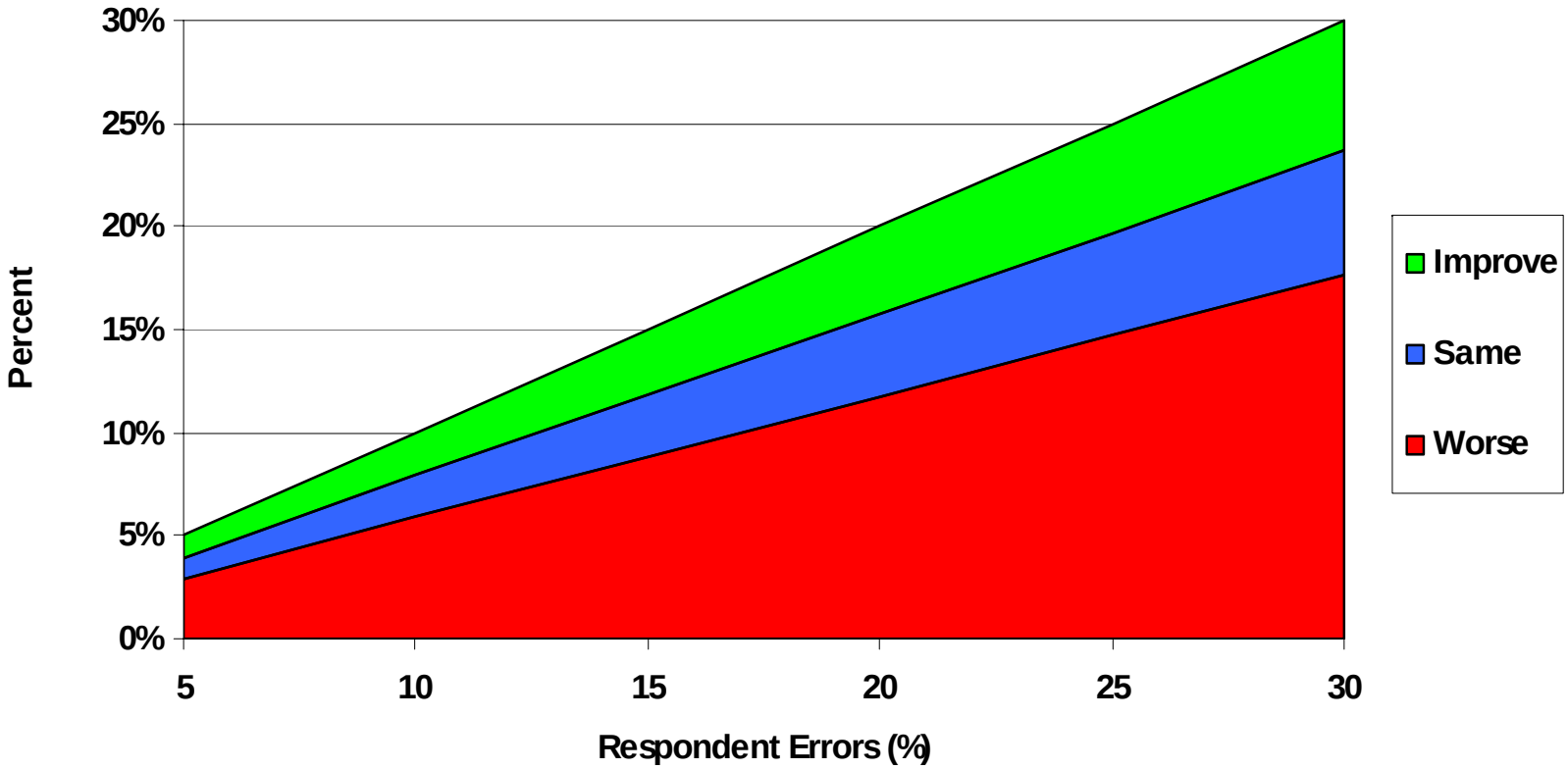
Distribution of Health Status Changes During Deployment



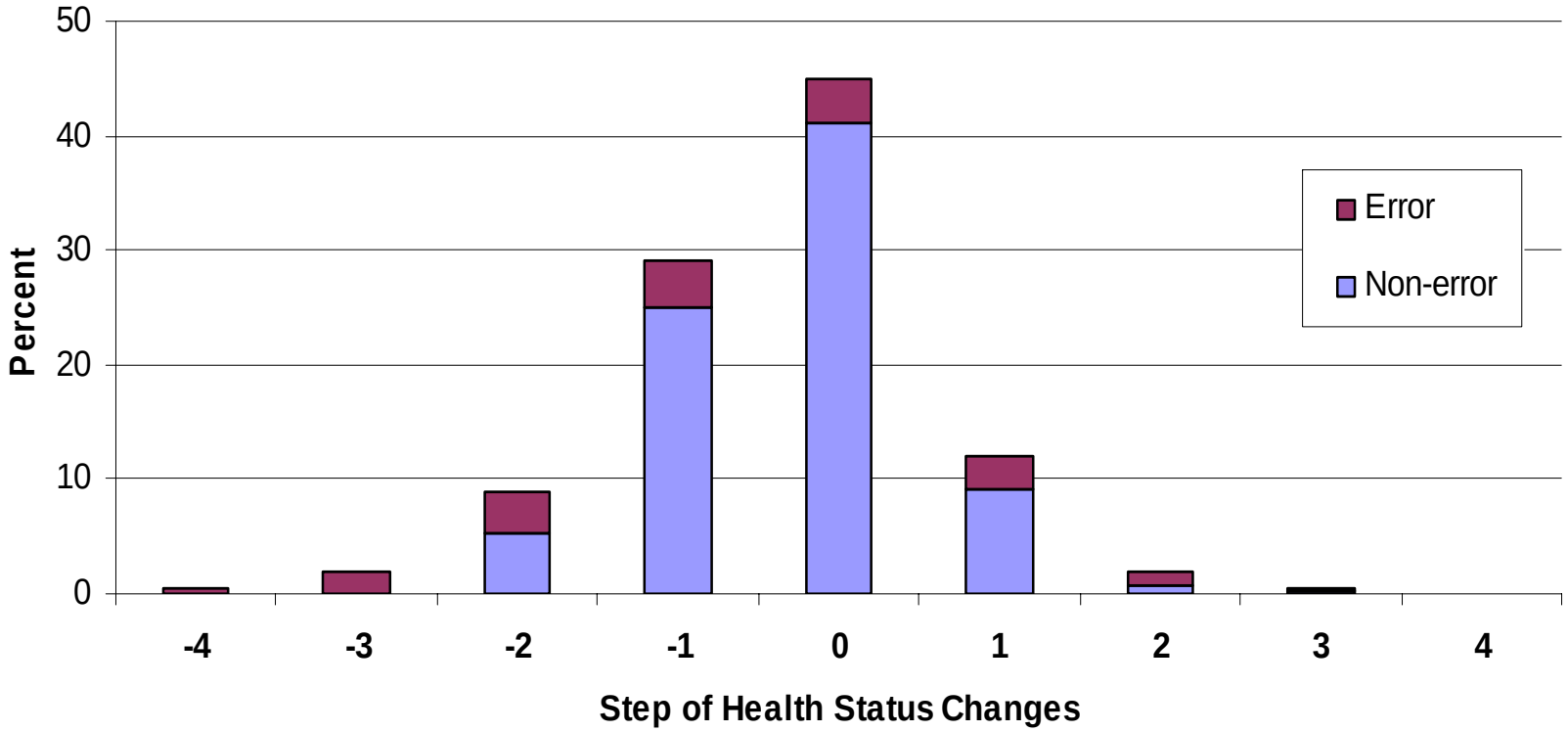
Contribution of Repondent Errors on Health Status Changes



Impact of Respondent Errors on Percentages of Self-Perceived Health Status Changes during Deployment



Impact of 20% Repondent Errors on Steps of Health Status Changes



Conclusions

- The step change distribution of self-assessed health status changes from pre- to post-deployment can be misleading.
- The distribution of self-assessed health status changes depends on pre-deployment health status (ceiling or flooring effect).
- Respondent errors tend to inflate the percentages of self-perceived declining health status.